CHIMERIC ANTIGEN RECEPTORS FOR THE TREATMENT OF LEUKEMIA AND OTHER CANCERS.

SUMMARY

A tumor-associated antigen Fms-Related Tyrosine Kinase 3 (FLT3) is known to be expressed on the cell surface of a majority of infant acute lymphoblastic leukemia (ALL) or acute myeloid leukemia (AML). NCI researchers have developed CARs comprising an antigen-binding fragment derived from a FLT3 targeting antibody. The resulting CARs can be used in adoptive cell therapy treatment for ALL or AML and other tumors which express FLT3. The NCI seeks licensees and/or co-development partners to commercialize this technology.

REFERENCE NUMBER

E-133-2016

PRODUCT TYPE

- Therapeutics

KEYWORDS

- chimeric antigen receptor, CAR, FLT3, leukemia

COLLABORATION OPPORTUNITY

This invention is available for licensing and co-development.

CONTACT

John D. Hewes
NCI - National Cancer Institute
240-276-5515

John.Hewes@nih.gov

DESCRIPTION OF TECHNOLOGY

Chimeric antigen receptors (CARs) are hybrid proteins consisting of an antibody derived binding fragment fused to signaling domains. The antibody derived binding fragment allows for the recognition of cancer associated targets and the signaling domains are T cell signaling domains that are components required for T cell activation. When CARs are expressed on a T cell, they allow the T cell to specifically identify and eliminate malignant cancer cells. This is a promising new therapeutic approach known as adoptive cell therapy.

FLT3 (a.k.a., Fms-Related Tyrosine Kinase 3) is a tumor-associated antigen that is known to be expressed on the cell surface of a majority of infant acute lymphoblastic leukemia (ALL) or acute myeloid leukemia

(AML). This technology concerns the development of CARs comprising an antigen-binding fragment derived from a FLT3 targeting antibody. The resulting CARs can be used in adoptive cell therapy treatment for ALL or AML and other tumors which express FLT3.

POTENTIAL COMMERCIAL APPLICATIONS

- Treatment of cancers associated with FLT3, including ALL and AML and may include any FLT3 over-expressing leukemia.

COMPETITIVE ADVANTAGES

- Some patients experience loss of expression of other surface antigens, such as CD19 which leads to disease relapse. Therefore, alternative targets for the targeting ALL will be necessary for treating ALL. As FLT3 is commonly activated by mutations that occur in both ALL and AML, it is likely an important pathway for leukemia making it less likely to be lost during treatment and hence an attractive target for CAR T cell therapy. Mutations most commonly occur in the intracellular portion of FLT3 so the FLT3 CAR, which recognizes the extracellular portion of FLT3, will be able to target both wild type and mutant FLT3.
- Infant ALL and AML patients have dismal prognoses from standard treatment and these populations are enriched for FLT3 expression, making them good candidate populations for FLT3 CAR therapy.

INVENTOR(S)

Terry J. Fry (NCI) and Christopher D. Chien (NCI)

DEVELOPMENT STAGE

- Discovery (Lead Identification)

PATENT STATUS

- **U.S. Provisional:** U.S. Provisional Application 62/342,394 (E-133-2016/0-US-01), filed May 27, 2016, entitled “FLT3-Specific Chimeric Antigen Receptors and Methods Using Same”

THERAPEUTIC AREA

- Cancer/Neoplasm